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**EFFECTS OF LISTENER AND CONTEXT ON THE SPOKEN STORIES
OF CHILDREN WITH AUTISM SPECTRUM DISORDER (ASD)
AND TYPICALLY DEVELOPING CHILDREN**

A Thesis Presented

by

Courtney Joy Ehlers

to

The Faculty of the Graduate College

of

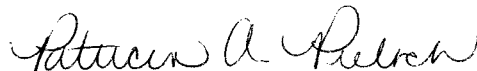
The University of Vermont

**In Partial Fulfillment of the Requirements
for the Degree of Master of Science
Specializing in Communication Sciences**

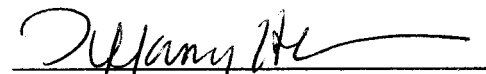
February, 2008


Accepted by the Faculty of the Graduate College, The University of Vermont, in partial fulfillment of the requirements for the degree of Master of Science, specializing in Communication Sciences.

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Abstract

Purpose: This study examined the narratives of children with autism spectrum disorder (ASD) and typically developing peers across different listeners and communicative context.

Method: Four children, between 8-11 years of age, with diagnoses of ASD (Asperger's syndrome and PDD-NOS) and average or above average non-verbal cognitive ability were language-age matched with similar chronological age, typically developing peers. Participants were asked to generate narratives from a wordless picture book, story-retell of a short film, and a personal experience. Participants told the three types of narratives to peer- and adult listeners in two separate sessions. Narratives were analyzed for story length, causal statements, internal states, character references, irrelevant information, and examiner prompts.

Results: No significant group differences were seen on measures of length, internal states, irrelevant information, or prompts. Compared to their typical peers, children with ASD were less likely to include causal statements in their story retell and wordless picture book narratives told to adult listeners and were more likely to use inaccurate or ambiguous references to characters in personal narratives told to an adult listener. The narratives told across various contexts and listeners by children with ASD were similar on measures of length, internal states, causal statements, use of irrelevant information, and prompts. Children with ASD used proportionally more correct character references in their narratives told to adults compared to their narratives told to children.

Conclusions: Compared to typically developing children, children with ASD may exhibit differences in their use of causal statements and references within narratives. Based on the measures analyzed, the narratives of children with ASD were more similar than different across types of listeners and communicative contexts. A follow-up study is needed to investigate the between- and within-group differences on measures of episodic structure and syntactic complexity.

Acknowledgements

It is an absolute pleasure to thank the many people who helped make this thesis a success. This work would not have been possible without the support and encouragement of my thesis committee members Rebecca McCauley, Tiffany Hutchins, Sara Burchard, and especially my advisor, Patricia Prelock, who endlessly shared her knowledge and enthusiasm, and inspired me further with every passing meeting.

I wish to thank the Organization of Autism Research and the University of Vermont, Department of Communication Sciences for the Graduate Research Grants that funded this study.

Many thanks to Monica Hong for her tireless dedication to transcribing the narratives; Leah Grossman, Eli Favro and Owen Kwass for attending narrative sessions and diligently listening to the participants tell their stories; the eight young individuals who gave their time and energy to participate in this study; and the families of these participants for their keen interest in this particular research and for allowing me to carry out the narrative sessions within their homes.

I would also like to thank Mary Alice Favro for the wisdom she shared through her gracious mentoring; Dale Thibault for her patience and lightheartedness in managing the budget; Alan Howard for the care he took in the many data analyses; my dear friends Cocoa Blake and Laura Bonazinga for always crafting the perfect blend of humor and optimism; Rebecca Bonnici for ‘giving an A’; my family for their unconditional love and support; and last, but definitely not least, my pal Corey Brink, who brightened each and every day and never stopped saying, “you can do it.”

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Introduction

A core deficit of autism spectrum disorder (ASD) is “an impairment in the nature and quality of social and communicative development” (Bregman, 2005, p. 3).

Fundamental to social and communicative development is skill and ease with pragmatics, the overlying rules for social use of a language. Even individuals with ASD who exhibit more advanced language skills, including those diagnosed with high functioning autism (HFA), pervasive developmental disorder-not otherwise specified (PDD-NOS) and Asperger’s syndrome (AS), demonstrate pragmatic impairments which hinder effective communication. These impairments include difficulties in taking into consideration the perspective and needs of the communication partner and adjusting the use of language to meet the demands of various contexts (Landa, 2000). In addition, they include difficulties in preparing the communication partner for a change in topic, or new, unrelated information and predicting what others are thinking, feeling or are likely to do (Bregman, 2005). Impairments in pragmatics not only affect the conversational interactions between two or more partners, but can also impact the use and quality of narratives.

Narratives, or stories about events, are found across a wide variety of contexts, cultures, and times (Reilly, Losh, Bellugi, & Wulfeck, 2004). They are a critical part of a child's everyday life, both educationally and socially (Page & Stewart, 1985) because they allow the child to make sense of and give meaning to the experiences and relationships within his or her own world (Applebee, 1978; Losh & Capps, 2003; Reilly et al., 2004). Typically developing children readily attain narrative abilities through daily experiences with stories and events (Page & Stewart, 1985). However, children with

ASD appear to differ in their development of narratives (Capps, Losh, & Thurber, 2000; Diehl, Bennetto, & Young, 2006; Norbury & Bishop, 2003; Tager-Flusberg, 1995).

The purpose of this study was to build upon previous research on the narrative abilities of children with ASD that examined narratives told to one adult examiner across one or two contexts. This study examined narrative quality across contexts of varying cognitive and linguistic demands. Narrative components examined included use of internal states, casual statements, character reference, and irrelevant information, as well as need for external prompts. Appropriate use of internal states, causal statements, and character reference contributes to overall narrative coherence and cohesion, whereas excessive use of irrelevant information and dependency on prompts to continue the story detracts from it. Information regarding performance on these measures across contexts and listeners and compared to typically developing peers contributes to the existing knowledge of the narrative abilities of children with ASD. This knowledge can be used to build a profile of strengths and challenges in narrative ability that may inform future assessment and intervention strategies for children with ASD.

Comprehensive Review of the Literature

This literature review builds a foundation for the methodology of the current study. First, an overview of narrative development in typically developing children is provided for a general understanding of the language of narratives and how children structure this language to construct coherent stories. Next, a review of the current literature on the narrative abilities of children with ASD is presented, including the linguistic, cognitive, and social demands that make narrative language challenging for these children, as well as the specific methods and findings that have contributed to the knowledge on this topic to date. Finally, a discussion of narrative context, as well as the differences in social communication found in children with ASD when interacting with peer and adult communication partners is discussed.

Narrative Development in Typically Developing Children

What is commonly thought of as a narrative is a story, or an individual's representation of a factual or fictional event or series of events (Applebee, 1978). Over the past sixty years, both spoken and written forms of children's narratives have been examined and have been found to develop throughout childhood, from the early pre-school years through adolescence.

Narratives can be categorized in terms of the purpose they serve for the speaker and the information they communicate to the audience/listener. These types include: fictional or anecdotal stories, including original stories and retellings, scripts, informative narratives, and recitations/performances (Loveland & Tunali, 1993). Story narratives may represent a real-life experience (e.g., getting hurt during a football game). They may also

be purely fictional (e.g., aliens invading the earth), or a combination of the two. Scripts relay a series of events that occur routinely (e.g., getting ready for bed), whereas informative narratives provide specific information and often follow the format of instructions, speeches, sermons, or lectures (Loveland & Tunali, 1993). Recitations consist of narrative speech that has been memorized by the speaker, such as a scene from a favorite television show or the “Pledge of Allegiance” (Loveland & Tunali, 1993, p. 251). Although all types of narratives play an important role in communication and socialization across a variety of settings, including home, school, and social gatherings, past research has focused primarily on factual and fictional story narratives.

The quality of a child’s narrative provides a breadth of information regarding his ability to organize information, provide causally connected events, and meet the needs of the listener based on one’s cultural knowledge and previous knowledge of the story. Children are typically first exposed to narratives at a very young age when parents or caregivers read aloud listener-oriented stories. These types of stories are characterized by a formal opening or title, formal closing, and consistent use of past tense (Willy, 1975 in Applebee, 1978). Children begin their first attempts at telling stories as early as two years of age, and by age five, both boys and girls exhibit consistent use of the above-mentioned characteristics (Pitcher & Prelinger, 1963 in Applebee, 1978). By age 5, children also begin to understand intentionality and goal-directed action; knowledge that enables early story-telling skills (Stein & Albro, 1997). As children begin school and are more likely to hear and experience stories on a daily basis, their narratives become increasingly

complex as they learn to impose an organizational structure (Applebee, 1978; Stein & Albro, 1997).

Historically, a number of frameworks have been used to analyze narratives (Applebee, 1978; Peterson & McCabe, 1983; Stein & Glenn, 1979). One framework explains narrative production in terms of the coherence and cohesion that is achieved when an individual attends to listener cues, makes connections among relevant events and characters, and provides an overall gestalt or theme of the narrative. The coherence of a story, also referred to as global structure or macrostructure, is what Applebee (1978) refers to as its overall shape. The primary elements of coherence that aid in forming the overall shape are story grammar and evaluative devices (Bamberg & Damrad-Frye, 1991; Stein & Glenn, 1979).

Story grammar is considered a schema, which represents an individual's interpretation of the story structure and includes the setting and episodes (Westby, 1984). Drawing from the work of Stein and Glenn (1979), Miller, Gillam, and Pena (2001) define episodes as including:

- (1) an initiating event: an external or internal event that influences a character
- (2) internal response: the character's goals, cognitions, plans, or reactions for/to the initiating event
- (3) attempt: information about the character's attempts to achieve his goal or his response to the initiating event
- (4) plan: information about what the character intends to do and why

(5) consequence: the result of the character's response and/or information about the resolution of the initiating event

(6) reaction: the character's reaction to the consequence and/or some type of ending

Narratives are often explained in terms of the nature of organizational structures that are seen throughout childhood. Applebee (1978) discussed the progression of these organizational structures as the production of heaps, sequences, primitive narratives, unfocused chains, focused chains, and true narratives. The heap does not have a clear organization, but rather consists of 'groups' or 'lists' of the child's perception. Sequences may impose a general order of events, but instead of linking events or statements with causality, the child produces statements that share a common characteristic or core, such as character or situation. Primitive narratives are developed by forming a set of statements, which relate to a concrete core. Primitive narratives differ from sequences because the statements, or events, complement one another. In unfocused chains, each statement connects to, or relates to the next; however, statements are no longer connected to a 'core.' It is not until focused chains that "the processes of chaining (connectives) and of centering around concrete attributes are joined within one narrative" (Applebee, 1978, p. 65). True narratives, the final organizational structure described by Applebee (1978) are composed of the schema of focused chains, but also include elaborations and clarifications (evaluative devices) that allow the speaker to relate story elements and details to the overall theme of the story. As children develop cognitively and linguistically, they progress through Applebee's levels of narrative development and

organization. By five to six years of age, the typical child is producing true narratives using all elements of story grammar (Applebee, 1978; Westby, 1984).

Similar to Applebee, Stein and Albro (1997) categorize early-developing stories into a developmental sequence including: no structure, descriptive sequences, action sequences, reactive sequences, and goal-based episodes. No structure and descriptive sequences include descriptions, typically about the character, but do not follow a causal or temporal sequence, and therefore, do not employ the use of connectives (e.g., “Once there was a frog who lived with a boy. He was sneaky. He got into a lot of trouble.”). Action sequences include descriptions that follow a temporal sequence, but do not employ causal statements. As the name implies, these stories consist of a list of the character’s actions (e.g., “The frog jumped in the water. He got out. He went for a walk. Then he ate lunch.”), much like a script one would use to describe a routine (e.g., “First I get out my toothbrush. Then I put toothpaste on it. Then I turn on the water.”). Reactive sequences reveal a greater level of complexity by connecting actions with causal links (e.g., “The frog saw a bee. The frog’s tongue hurt because the bee stung it.”). Finally, goal-based episodes are what adults consider a true story. They entail further complexity, with true episodes (Stein & Glenn, 1979), or goal-directed action sequences, which include “the setting of a goal, decisions about whether to pursue the goal, an overt attempt to attain the goal, and an outcome indicating whether or not the goal has been attained” (Stein & Albro, 1997, p. 14).

The use of evaluative devices, the other component of story coherence, allows the child to communicate his/her perspective or interpretation of the story (Capps, Losh, &

Thurber, 2000; Norbury & Bishop, 2003) and maintain the interest of the listener (Capps, et al., 2000). A child may communicate this perspective through the use of emotional (e.g., ‘The frog was *mad*’) and cognitive states (e.g., ‘She *knew* the boy was up to no good.’), character speech (e.g., “The boy said, “I got you now!”), sound effects (e.g., “glug, glug, glug”), intensifiers (e.g., “the baby was *really* scared”), attention-getters (e.g., “look at that!”), negatives (e.g., ‘The boy *didn’t* know his frog was missing.’), and ‘hedges’ (e.g., “The frog *might* have been hungry.”) (Bamberg & Damrad-Frye, 1991; Capps et al., 2000).

Bamberg and Damrad-Frye (1991) examined the use of evaluative devices by five- and nine-year old children, as well as adults in a wordless picture book task. They found that the five-year-old children used all types of evaluative devices in their narratives and both the nine-year-old children and adults used significantly more evaluative devices than the younger children. From this finding, the authors concluded that the use of evaluative devices, like other narrative components, starts early and increases with age. In addition, the authors noted that young children did not exhibit favorable use of a particular type of evaluation while both the nine-year-old and adult groups used cognitive and emotional states more frequently than other evaluative devices. These findings seem to highlight the importance of reference to cognitive and emotional states, or expressing the internal states of the character, as children’s narratives increase in complexity.

Cohesion, or narrative microstructure, is the ‘glue that holds the story together’. It includes elements that tie propositions together, referred to as connectives. These

include conjunctions (e.g., and, but) (Justice et al., 2006), elements that reveal information regarding the relationship between events and characters, such as temporal (e.g., then, after) and causal links (e.g., because, for) (Shapiro & Hudson, 1991), as well as references, which refer to an object, character, or event that has previously been introduced (e.g., he, they, it). In the early stages of narrative development, children commonly use conjunctions and temporal links to connect characters' actions and events. Although young children may use simple causal links (e.g., sequencing) early on, not until approximately five to six years of age do they start consistently using a variety of causal connectives (e.g., because, so) to increase narrative cohesion. Additionally, the use of causal connectives appears to increase in conjunction with the development of internal states because children learn to describe characters' motivations for or reactions to events within story episodes (Kemper & Edwards, 1986).

Past studies have examined children's use of third-person reference, including character introduction and maintenance, via narratives elicited by wordless picture books such as *Frog, Where Are You?* (Mayer, 1969) (Bamberg, 1986; Kail & Hickman, 1992 in Bamberg, 1997; Wigglesworth, 1992 in Bamberg, 1997). In Bamberg's (1997) review of past studies, he noted that children as young as three years of age use a common set of linguistic methods to introduce new story characters and refer to previously-identified story characters. Using "the least presupposing form" (p. 103), children introduce story characters with either noun phrases beginning with a definite article (e.g., "the boy") or indefinite article (e.g., "a boy"). These types of noun phrases are also used to reintroduce characters after a different character has come into focus (e.g., "*The boy* was sitting at the

table. *The frog* jumped onto the ground while *the boy* looked at his menu.”) to prevent listener confusion. Pronouns (e.g., “he”) are used to maintain the identity of a previously introduced character whose focus is not disrupted by another character (e.g., “The frog jumped out of the basket. *He* hopped down the road. Then *he* came upon a pond.”).

As was evident in the preceding descriptions of narrative development, children become more adept at using the elements of both coherence and cohesion as they progress through childhood (Applebee, 1978; Bamberg & Damrad-Frye, 1991; Kemper & Edwards, 1986; Stein & Albro, 1997). By age five to six years, they produce complete episodes with evaluative devices including mental state terms and story interpretation to facilitate story coherence. Further, they use cohesive devices including references and causal connections to facilitate the linguistic ‘glue’ necessary to enhance story meaning. Additionally, as children continue to develop through the primary school years their narratives increase both in length and complexity (Peterson & McCabe, 1983).

Narrative Development in Children with ASD

Telling a narrative is a demanding task, requiring the use of linguistic, cognitive and social abilities (Reilly et al., 2004; Westby, 1982). A narrator must decide what information is important and organize it in a coherent fashion (Loveland & Tunali, 1993), assess the relationship between the events and theme of the story (Reilly et al., 2004), infer mental and emotional states of the characters' and motivations of their actions (Reilly et al., 2004), and recognize causal relationships between events (Applebee, 1978). A narrator must also use grammatical devices to encode information about characters and events while relaying information in an appropriate temporal sequence (Reilly et al.,

2004). Furthermore, a narrator is required to monitor and maintain the audience's attention by recognizing the audience's previous knowledge and level of understanding, and adjusting the story to meet these needs (Capps et al., 2000; Loveland & Tunali, 1993; Reilly et al., 2004).

Numerous studies have begun to examine the differences in the spoken narratives of children with ASD to those of typically developing children and children with other developmental delays. Cognitively, narratives of children with ASD are less likely to include talk about a character's mental and emotional states (Baron-Cohen, Leslie, & Frith, 1986; Losh & Capps, 2003), causal relationships concerning thoughts and feelings, behaviors, actions, or events (Capps et al., 2000; Diehl et al., 2006; Losh & Capps, 2003; Tager-Flusberg, 1995), and mention of the story's resolution (Tager-Flusberg, 1995). In addition, children with ASD introduce characters or objects in an ambiguous manner (e.g., introduce a character with a pronoun) (Loveland, McEvoy, Tunali, & Kelley, 1990; Norbury & Bishop, 2003; Tager-Flusberg, 1995) and include irrelevant or bizarre information that detracts from the meaning of the story (Diehl et al., 2006; Losh & Capps, 2003; Loveland, et al., 1990; Norbury & Bishop, 2003). Linguistically, narratives of children with ASD, compared to those of typically developing children, have been found to be shorter in length (Capps et al., 2000; Tager-Flusberg, 1995), less syntactically complex (Capps et al., 2000; Losh & Capps, 2003; Norbury & Bishop, 2003), grammatically deficient (Tager-Flusberg, 1995), and more dependent on examiner prompts for clarification or elaboration (Losh & Capps, 2003). Socially, the narratives of children with ASD fail to exhibit the narrator's awareness of the listener's needs

(Loveland et al., 1990) and lack appropriate or broad use of evaluative devices (Capps et al., 2000; Losh & Capps, 2003; Norbury & Bishop, 2003).

In an early study of narrative ability, Baron-Cohen and colleagues (1986) examined the abilities of 21 children, ages 6 to 16 years, diagnosed with ASD, children ages 6 to 17 years, diagnosed with Down's syndrome (DS), and typically developing preschool-age children to accurately arrange a series of pictures into story sequences and subsequently narrate the stories. After the participants sequenced each set of pictures, they were asked to tell the story to the adult examiner and were provided with prompts when necessary. In terms of narrative language, the researchers specifically examined the participants' use of causal, mental state, and descriptive language terms. Compared to the DS and typically developing groups, the ASD group used significantly fewer mental state terms and tended to rely on descriptive statements (instead of causal statements), in their narratives, which the investigators attributed to "a specific deficit in social understanding" (Baron-Cohen, 1986, p. 122).

Loveland et al. (1990) compared story-retell narratives of 16 children and adolescents with high functioning autism (HFA) to those of individuals with Down's syndrome (DS). The participants, between ages 5 and 27, were matched on verbal-mental age. After two consecutive viewings of either a puppet show or a videotaped sketch, each participant retold his/her story to a familiar adult listener who was not present during the original viewings of the story. Results indicated that the HFA and DS groups did not differ significantly in length of narratives, number of story events recalled, frequency of ambiguous references to characters and events, repetition of information, intrusions of

information not part of the original story, or number of examiner prompts required. The HFA group did, however, include more instances of bizarre/inappropriate information in their narratives compared to the DS group, despite similar performance between the two groups on follow-up questions regarding factual information about the story. The HFA group's higher frequency of bizarre/inappropriate statements could not be attributed, therefore, to limitations in memory or story comprehension. Instead, the investigators suggested that these statements were evidence of a possible limitation in understanding what a story is, or more specifically, understanding the pragmatic rules of narrative storytelling, such as including only information relevant to the story and taking the needs of the listener into consideration. Moreover, while groups did not differ in the frequency of ambiguous references, the HFA participants exhibited qualitative differences in their use of references, characterized by a greater tendency to use what the authors referred to as 'external references', in which they depicted story characters as objects. This inappropriate use of character reference further supports the idea that children with autism may lack an understanding of the listener's needs.

Diehl and colleagues (2006) examined the story-retell narratives of 17 individuals with HFA between the ages of 6 and 14, compared to age-, gender-, language-, and cognitive ability-matched typically developing peers. Participants listened to an audiotaped narration of the story *Frog Where Are You?* (Mayer, 1969) while looking at the wordless picture book. They subsequently retold their story narratives, without the use of the picture book, to the adult examiner, who was not present during the audiotaped narration. The researchers found no significant group differences in story length,

proportion of basic story elements or details recalled, or syntactic complexity. The HFA group did, however, include a greater proportion of odd or inappropriate storytelling and conveyed less causally coherent narratives compared to their typically developing peers. The authors remarked, “their retellings were more like a listing of discrete events than a structured narrative” (Diehl et al., 2006, p. 96). The HFA group’s differences in inappropriate storytelling and causal connectedness, compared to the typically developing group, revealed impairments in the social norms of narrative language.

Several studies have examined the narratives of individuals with ASD using the wordless picture books *Frog on His Own* (Mayer, 1973) and *Frog Where Are You?* (Mayer, 1969). In these instances, participants were given the opportunity to look through the pages of the book and immediately relate the story to an adult examiner. Tager-Flusberg (1995) compared the wordless picture book narratives of 10 children with ASD to verbal-mental age (mean = 6 years, 8 months) matched typically developing children and a group of verbal-mental and chronological age-matched children with developmental delays (DD). Narratives were elicited using the wordless picture book *Frog Where Are You?* Participants were provided prompts (e.g., What is going on here?) as necessary and were asked, by the examiner, how the story ends when they reached the final page. The investigator found no significant group differences in the use of character references or evaluative devices, including mention of emotional states. However, participants in the ASD group provided shorter stories and were less likely to include causal statements compared to either the DD or the typically developing group. In addition, both ASD and DD groups were more likely to introduce characters in an

ambiguous manner and were less likely to include a resolution to their narratives compared to the typically developing group. Therefore, impairments in character reference and story structure were not specific to the ASD group, whereas differences in story length and causal statements were specific to this group. A group difference in story length was not evident in either of the story retell studies, which suggests a possible context-specific challenge. It may be that individuals with ASD tell shorter stories, compared to DD or typically developing peers, in the wordless picture book context because they are not first provided with the story schema as they are in the retell context (Tager-Flusberg, 1995). A surprising finding was that the ASD group did not differ significantly in their use of emotional and mental state terms. However, the data revealed that participants in all three groups were unlikely to refer to characters' mental or emotional states, which the investigator attributed to the particular stimulus (Tager-Flusberg, 1995).

Tager-Flusberg and Sullivan (1995) used the wordless picture book, *Frog on His Own*, a stimulus found to be more likely to encourage individuals' use of mental and emotional state terms, to elicit narratives from children with ASD (autism, PDD-NOS, and Asperger's syndrome; $n = 27$), developmental delays (DD), and typically developing peers. The participants with ASD, between 6 and 22 years of age, were matched on mental- and language-age with the DD group and the chronological age of typically developing peers was similar to the mean mental age of the ASD and DD groups. As in the previous study, participants imparted their narratives to an adult examiner and were provided with prompts for elaboration when necessary. The investigators found the

narratives of the three groups to be similar on measures of story length, use of lexical connective devices marking temporal (e.g., *later*) or causal relation (e.g., *because*), and use of emotional and mental state terms. They attributed the lack of group differences on narrative measures, in contrast to previous studies (Loveland, et. al, 1990; Tager-Flusberg, 1995), to their strict procedures for language-matching groups. In addition to matching ASD and DD groups on receptive vocabulary performance using the *Peabody Picture Vocabulary Test-Revised* (PPVT-R; Dunn, Dunn, Robertson, & Eisenberg, 1981), they also matched these groups on syntactic comprehension and productive language ability using subtests of the *Clinical Evaluation of Language Fundamentals* (CELF; Semel, Wiig, & Secord, 1987), which they believed eliminated the ASD-specific deficits found in previous studies of narrative language. It should be noted, however, that the investigators found participants with ASD to demonstrate challenges in appropriately answering follow-up questions regarding the identification and explanation of character's emotional states, demonstrating this group's difficulty in interpreting emotions and placing them within a causal framework.

Following the methodology of Tager-Flusberg and Sullivan (1995), Capps and colleagues (2000) used the wordless picture book *Frog on His Own* to elicit narratives from participants with ASD ($n = 13$), mental- and language-age matched participants with developmental delays (DD) and language-age (mean = 6 years, 2 months) matched typically developing peers. Again, the participants relayed their narratives to an adult examiner. Based on the results, the three groups did not differ significantly in their proportion of morphological errors and evaluative devices, including causal statements

explaining behaviors, and mention of internal states, or emotional and mental state terms. The ASD and DD groups, however, produced shorter stories (did not use prompts), and were less likely to use complex syntax compared to the typically developing group. The finding of shorter stories from the ASD and DD groups is in agreement with Tager-Flusberg (1995), but not with Tager-Flusberg and Sullivan (1995). Capps et al. did not employ the use of examiner prompts to encourage participants' elaboration or continuation of narratives, as did previous studies. Therefore, while the differences in findings between these studies may be a result of group matching procedures, as mentioned above, it should also be noted that the methodology regarding examiner prompts may reveal relative differences in narrative measures, especially measures of story length.

In addition to group differences in story length and syntactic complexity, Capps et al. (2000) also found ASD and DD groups to be less likely to identify causes of character's internal states, and instead simply label or make reference to physical evidence of emotions (e.g., frown, cry). This evidence of the ASD group's challenge in placing emotions within a causal explanatory framework is consistent with the results of Tager-Flusberg and Sullivan's (1995) follow-up questions on emotional understanding.

In another study of wordless picture book narratives, Norbury and Bishop (2003) took a close look at the linguistic ability differences between similar groups of children between 6 and 10 years of age. The four groups, HFA (n = 12), specific language impairment (SLI), pragmatic language impairment (PLI) and typically developing children all demonstrated non-verbal cognitive abilities within the normal range, while

participants in the HFA and PLI groups demonstrated documented impairments in pragmatic language abilities. Narratives elicited using the wordless picture book *Frog, Where Are You?* were told by participants to an adult examiner. The findings revealed that groups did not differ on measures of narrative length, coherence as measured by episodic structure (e.g., initiating event, attempt, and consequence), cohesion (e.g. frequency and types of character references used), or evaluative devices (e.g., frequency of mental and emotional state terms). However, HFA, PLI, and SLI groups used less complex syntax than the typically developing group. This finding of an impairment in complex syntax, compared to typically developing peers, is in agreement with Capps et al. (2000). The only significant difference Norbury and Bishop found in the narratives of the HFA group compared to the PLI and SLI groups was a greater frequency of ambiguous nouns, which the investigators attributed to this group's limited awareness of the needs of the listener.

Losh and Capps (2003) were the only investigators to compare the narratives of children with ASD to those of typically developing peers across different communicative contexts. Twenty-eight participants diagnosed with ASD (HFA and Aspergers' syndrome) between the ages of 8 and 14 years were matched with typically developing peers based on chronological- and verbal-mental age. Wordless picture book narratives were elicited using *Frog Where Are You?* and personal narratives were elicited through semi-structured conversations that were initiated with questions regarding the child's family, friends, pets, and interests. Participants told both narratives to an adult examiner, who provided prompts for elaboration and clarification when necessary. The researchers

found the story book narratives of both groups to be similar with regard to story length, complex syntax and emotional and mental state terms. They found that both groups were able to establish and maintain the theme of the story book, although the ASD group included fewer overall episodes, or story components. In comparison to the typically developing group, the ASD group was less likely to include causal statements in their story book narratives, a finding in agreement with Tager-Flusberg (1995). As expected, Losh and Capps (2003) found more between-group differences in the personal narrative context, which provides less structure and support than the story book context. Their results revealed that, in comparison to the typically developing group, the ASD group used less complex syntax, emotional and mental state terms, and causal explanations, included more irrelevant information, and was more dependent on examiner prompts for clarification and elaboration. Although an impairment in the use of causal statements was apparent across both narrative contexts for the ASD group, the majority of this group's linguistic and cognitive-social limitations were specific to the personal narrative context, a context more closely simulating typical, daily socialization.

Based on the differences in methodology of the studies reviewed and the recent findings of Losh and Capps (2003), there is a need to further examine the narratives of children with ASD across various communicative contexts to continue to develop a profile of linguistic, cognitive, and social strengths and challenges in narrative language. A valuable addition to this profile would be information regarding any differences in narratives told to different types of listeners, since previous studies have only required participants with ASD to tell their narratives to adult examiners. Continued research

investigating the narrative abilities of children with ASD across contexts and listeners may help establish the most facilitative context for the development of narratives in this population (Losh & Capps, 2003).

Demands of Different Types of Elicitation

As revealed by Losh and Capps (2003), there is likely to be considerable variation in the coherence and cohesiveness of narratives elicited across various contexts, due to the demands placed on the narrator and the varying levels of contextual support (Klecan-Aker, McIngvale, & Swank, 1987). In a story retell context, the narrator views and/or listens to a story with an existing organized structure and content. Thus, the narrator is provided with the framework of the story schema and is only required to reproduce this information (Johnston, 1982; Klecan-Aker et al, 1987; Loveland & Tunali, 1993). However, this task is not as simple as it may appear. Retelling a story requires the narrator comprehend and interpret the story, as well as hold it in his working memory long enough to relay it to the listener. In addition, the narrator must determine what information from the story is relevant and determine the needs of the listener based on his previous knowledge.

Generating a story from the pictures of a wordless picture book eliminates the memory demands from the story retell by providing a story schema through the visual supports of sequenced pictures. However, in this context, the narrator must interpret the pictures and synthesize the individual meaning into a whole in order to communicate the story in a coherent manner (Loveland & Tunali, 1993), as well as take into consideration the needs of the listener.

Generating a narrative of a personal experience may be considered the most demanding task of the three, due to lack of contextual support and high demands on both memory and social ability of recognizing the listener's previous knowledge. Unlike the other narrative tasks, here, the narrator is completely responsible for developing the content of the story. In this task, the narrator must rely on memory to recall the previous experience, determine what information is relevant, and further determine how to organize the information in a manner the listener will understand (Loveland & Tunali, 1993). This type of narrative is closest to a child's everyday use of language.

Differences in Listener

Although it has been identified that children with ASD are less likely to engage with peers when compared to typically developing children (Sherman, Shapiro, & Glassman, 1983; Stone & Caro-Martinez, 1990; Stone & Lemanek, 1990) there has been limited research on how the social communication of children with ASD may differ between peer and adult communication partners. One study (Hauck, Fein, Waterhouse, & Feinstein, 1995) observed the social initiations made by children with ASD in natural settings. The researchers did not find significant differences in the number of initiations made to peers compared to those made to adults; however, they did find qualitative differences in these initiations. They reported that the majority of initiations made to adults were either routine greetings or served the purpose of seeking information. As with adult, initiations made to peers included routine greetings, however, the children with ASD also communicated with peers with the intention of sharing information. The qualitative differences found in these initiations motivate the need to explore such

differences across more complex interactions and discourse. Determining possible differences in narrative ability when speaking to peers and adults may provide further insights on the social communication profile of children with ASD.

Research Questions

The purpose of this study was to compare the narratives of children with autism spectrum disorders (ASD) to those of typically developing peers across various contexts and when speaking to adult and peer listeners. Three general questions were addressed:

- How do the narratives of children with ASD differ when retelling a story of a previously viewed film, telling the story of a wordless picture book, and telling a story of personal experience?
- How do the narratives of children with ASD differ when the listener is an adult or child?
- How do the narratives of children with ASD, when examined across contexts and types of listener, differ from those of typically developing, language-age matched peers?

Article

Effects of Listener and Context on the Spoken Stories of Children with Autism Spectrum
Disorder (ASD) and Typically Developing Peers

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Abstract

Purpose: This study examined the narratives of children with autism spectrum disorder (ASD) and typically developing peers across different listeners and communicative context.

Method: Four children, between 8-11 years of age, with diagnoses of ASD (Asperger's syndrome and PDD-NOS) and average or above average non-verbal cognitive ability were language-age matched with similar chronological age, typically developing peers. Participants were asked to generate narratives from a wordless picture book, story-retell of a short film, and a personal experience. Participants told the three types of narratives to peer- and adult listeners in two separate sessions. Narratives were analyzed for story length, causal statements, internal states, character references, irrelevant information, and examiner prompts.

Results: No significant group differences were seen on measures of length, internal states, irrelevant information, or prompts. Compared to their typical peers, children with ASD were less likely to include causal statements in their story retell and wordless picture book narratives told to adult listeners and were more likely to use inaccurate or ambiguous references to characters in personal narratives told to an adult listener. The narratives told across various contexts and listeners by children with ASD were similar on measures of length, internal states, causal statements, use of irrelevant information, and prompts. Children with ASD used proportionally more correct character references in their narratives told to adults compared to their narratives told to children.

Conclusions: Compared to typically developing children, children with ASD may exhibit differences in their use of causal statements and references within narratives. Based on the measures analyzed, the narratives of children with ASD were more similar than different across types of listeners and communicative contexts. A follow-up study is needed to investigate the between- and within-group differences on measures of episodic structure and syntactic complexity.

Effects of Listener and Context on the Spoken Stories of Children with Autism Spectrum Disorder (ASD) and Typically Developing Peers

A core deficit of autism spectrum disorder (ASD) is “an impairment in the nature and quality of social and communicative development” (Bregman, 2005, p. 3).

Fundamental to social and communicative development is skill and ease with pragmatics, the overlying rules for social use of a language. Even individuals with ASD who exhibit more advanced language skills, including those diagnosed with high functioning autism (HFA), pervasive developmental disorder-not otherwise specified (PDD-NOS) and Asperger’s syndrome, demonstrate pragmatic impairments which hinder effective communication. These impairments include difficulties in taking into consideration the perspective and needs of the communication partner and adjusting the use of language to meet the demands of various contexts (Landa, 2000). In addition, they include difficulties in preparing the communication partner for a change in topic, or new, unrelated information and predicting what others are thinking, feeling or are likely to do (Bregman, 2005). Impairments in pragmatics not only affect the conversational interactions between two or more partners, but can also impact the use and quality of narratives.

Narratives, or stories about events, are found across a wide variety of contexts, cultures, and times (Reilly, Losh, Bellugi, & Wulfeck, 2004). They are a critical part of a child's everyday life, both educationally and socially (Page & Stewart, 1985) because they allow the child to make sense of and give meaning to the experiences and relationships within his or her own world (Applebee, 1978; Losh & Capps, 2003; Reilly et al., 2004). Typically developing children readily attain narrative abilities through daily

experiences with stories and events (Page & Stewart, 1985). However, children with ASD appear to differ in their development of narratives (Capps, Losh, & Thurber, 2000; Diehl, Bennetto, & Young, 2006; Norbury & Bishop, 2003; Tager-Flusberg, 1995).

Telling a narrative is a demanding task, requiring the use of linguistic, cognitive and social abilities (Reilly et al., 2004; Westby, 1982). A narrator must decide what information is important and organize it in a coherent fashion (Loveland & Tunali, 1993), assess the relationship between the events and theme of the story (Reilly et al., 2004), infer mental and emotional states of the characters' and motivations of their actions (Reilly et al., 2004), and recognize causal relationships between events (Applebee, 1978). A narrator must also use grammatical devices to encode information about characters and events while relaying information in an appropriate temporal sequence (Reilly et al., 2004). Furthermore, a narrator is required to monitor and maintain the audience's attention by recognizing the audience's previous knowledge and level of understanding, and adjusting the story to meet these needs (Capps et al., 2000; Loveland & Tunali, 1993; Reilly et al., 2004).

Numerous studies have begun to examine the differences in the spoken narratives of children with ASD to typically developing children and children with other developmental delays. Cognitively, narratives of children with ASD are less likely to include talk about a character's mental and emotional states (Baron-Cohen, Leslie, & Frith, 1986; Losh & Capps, 2003), causal relationships concerning thoughts and feelings, behaviors, actions, or events (Capps et al., 2000; Diehl et al., 2006; Losh & Capps, 2003; Tager-Flusberg, 1995), and mention of the story's resolution (Tager-Flusberg, 1995). In

addition, children with ASD introduce characters or objects in an ambiguous manner (e.g., introduce a character with a pronoun) (Loveland, McEvoy, Tunali, & Kelley, 1990; Norbury & Bishop, 2003; Tager-Flusberg, 1995) and include irrelevant or bizarre information that detracts from the meaning of the story (Diehl et al., 2006; Losh & Capps, 2003; Loveland et al., 1990; Norbury & Bishop, 2003). Linguistically, narratives of children with ASD, compared to those of typically developing children, have been found to be shorter in length (Capps et al., 2000; Tager-Flusberg, 1995), less syntactically complex (Capps et al., 2000; Losh & Capps, 2003; Norbury & Bishop, 2003), grammatically deficient (Tager-Flusberg, 1995), and more dependent on examiner prompts for clarification or elaboration (Losh & Capps, 2003). Socially, the narratives of children with ASD fail to exhibit the narrator's awareness of the listener's needs (Loveland et al., 1990) and lack appropriate or broad use of evaluative devices (Capps et al., 2000; Losh & Capps, 2003; Norbury & Bishop, 2003).

The purpose of this study was to build upon previous research on the narrative abilities of children with ASD that examined narratives told to one adult examiner across one or two contexts. This study examined narrative quality across contexts of varying cognitive and linguistic demands. Narrative components examined included use of story length, internal states, casual statements, character reference, and irrelevant information, as well as need for external prompts. Appropriate use of internal states, causal statements, and character reference contributes to overall narrative coherence and cohesion, whereas excessive use of irrelevant information and dependency on prompts to continue the story detracts from it. Information regarding participants' performance on these measures

across contexts and listeners and compared to typically developing peers contributes to the existing knowledge of the narrative abilities of children with ASD. This knowledge can be used to build a profile of strengths and challenges in narrative ability that may inform future assessment and intervention strategies for children with ASD.

Methods

Participants

Four individuals with ASD and four typically developing children, ranging in age from 8 years to 11 years, 3 months, participated in this study. Of the four participants with ASD, two were diagnosed with Asperger's syndrome and two were diagnosed with a pervasive developmental disorder not otherwise specified (PDD-NOS). Diagnoses were consistent with the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., DSM-IV, American Psychiatric Association, 1994) criteria and verified through review of medical records. In addition, all diagnoses of ASD were confirmed through recent diagnostic testing unrelated to this study. Three of the participants with ASD were administered the *Autism Diagnostic Observation Scale* (ADOS; Lord, Rutter, DiLavore & Risi, 1999) within the last 18 months as part of another study (Hutchins & Prelock, 2004) while the other participant was administered the *Gilliam Asperger Disorder Scale* (GADS; Gilliam, 2001) through his public school.

All participants were monolingual speakers of English, exhibited vision and hearing within normal limits, or otherwise corrected, per parental report, and exhibited articulation within normal limits as judged informally by the principal investigator. Participants from the two groups were distribution matched on language ability using the Core Language Score (CLS) from the following subtests of the *Clinical Evaluation of Language Fundamentals-4* (CELF-4; Semel, Wiig, & Secord, 2003): Concepts and Following Directions, Formulated Sentences, Recalling Sentences, and Word Classes-Receptive and Expressive. In addition, children with ASD were administered the

Peabody Picture Vocabulary Test-Third Edition (PPVT-III; Dunn & Dunn, 1997) to provide information regarding receptive vocabulary and *The Test of Nonverbal Intelligence- Third Edition* (TONI-3; Brown, Sherbenou, & Johnsen, 1997) to obtain a measure of nonverbal intelligence. Language and cognitive performance of all participants with ASD, as measured by the CELF-4 and TONI-3, was no lower than one standard deviation below the mean expected for his age and commensurate with an age equivalent of at least six years, the age at which typically developing children are usually demonstrating true narratives (Westby, 1984). Table 1 presents the descriptive characteristics of all the participants.

Procedures

Building on the work of Losh and Capps (2003), who elicited children's narratives from two different discourse contexts (e.g., wordless picture book and personal narrative), this study also required participants to retell of a story from video. Consistent with previous studies on narrative ability in children with ASD (Capps et al., 2000; Tager-Flusberg & Sullivan, 1995), the 28-page wordless picture book *Frog on His Own* (Mayer, 1973) was used to elicit storybook narratives from each participant. This is a story about a frog who escapes from his owner to cause multiple episodes of mischief throughout a city park.

The wordless video, *Frog Goes to Dinner* (Sturner & Templeton, 2001) was used to elicit story retell narratives from each child. This video was chosen due to its similarity to the *Frog on His Own* picture book in number of episodes and frequency of events likely to elicit internal state terms and causal statements in narratives. The video is a story

of a boy who brings his frog out to dinner in a fancy restaurant. The frog escapes from his owner's pocket and manages to wreak havoc throughout the restaurant before finally being captured and nearly cooked alive by a fuming chef.

Personal narratives were elicited through a simple conversational procedure between the principal investigator and the participant. The principal investigator asked each participant to tell a story about himself/herself. She gave each participant topic ideas likely to stimulate the child's interest (e.g., birthday party, vacation, injury) and negotiated the topic as necessary.

Narratives were elicited over two sessions, approximately sixty-minutes each, no more than three weeks apart. The participants told the three narratives, one of each type (i.e., story retell, wordless picture book, and personal narrative), to a peer in one session and an adult in another session. Two children, ages nine and ten, of faculty members in the Department of Communication Sciences at the University of Vermont served as peer listeners, while two young female adults in their third year of undergraduate study served as the adult listeners. Only one listener attended each session. To counter-balance the type of listener, two participants with ASD and two typically developing participants, randomly selected, told their narratives to a peer in the first session and an adult in the second session while the other two participants with ASD and two typically developing participants told their narratives to an adult in the first session and a peer in the second session. The order in which the narratives were elicited in each session was systematically randomized. The narratives were video and audio taped.

Elicitation of Story Retell Narrative

Each participant was tested individually by the principal investigator in a quiet room in his/her home. For the story retell narrative, participants viewed the nine minute video, *Frog Goes to Dinner* (Sturner & Templeton, 2001) in the testing room. Participants were provided with the following directions by the principal investigator before watching the video (Klecan-Aker & Kelty, 1990; Liles & Purcell, 1987; Olley, 1989; Tager-Flusberg & Sullivan, 1995): “I have a video that I am going to show you called *Frog Goes to Dinner*. After you watch the video, I want you to tell the story to _____ (name of listener). _____ (name of listener) has never seen the video before, so I want you to tell him/her as much as you can about the story.” The investigator sat with each participant as he/she watched the video, while the listener waited in another room. When the video finished, the listener entered the room and was seated next to the participant. The participant was reminded of the initial instructions: “Tell ____ (name of listener) the story in the video. Remember, _____ (name of listener) has never seen the video before, so tell as much of the story as you can.” While each participant told his/her narrative, the principal investigator sat across the room, with her head turned, to communicate that she was not a listener. However, the principal investigator provided simple verbal prompts as necessary to provide further narration (i.e., “Is there anything else?”, “Then what happened?”, “Tell the story to _____ (listener).”) (Losh & Capps, 2003; Miranda et al., 1998; Tager-Flusberg, 1995; Tager-Flusberg & Sullivan, 1995). Prompts were only given if the participant stopped speaking for more than five seconds, judged informally by the investigator, became engaged in a

different activity, or began to relay his/her narrative directly to the principal investigator or the video camera. No more than three prompts were given for each narrative.

Elicitation of Wordless Picture Book Narrative

The principal investigator gave the following directions to each participant for the wordless picture book narrative: “I have a book called, *Frog on His Own*. It has pictures that tell a story, but it doesn’t have any words. I’d like you to turn through the book and look at all the pictures first. Then when you’re ready, you can use the book to tell the story, page by page, to ____ (name of listener). ____ (name of listener) has never seen this book before, so I want you to tell him/her as much of the story as you can.”

After the introduction, the principal investigator sat nearby as the participant turned through the book. She allowed appropriate time for the participant to familiarize himself/herself with the story. As with the video, the listener sat in another room while the participant looked through the book. After the participant finished looking through the book, the listener entered the room and the participant was reminded of the initial instructions: “Tell the story, page by page to ____ (name of listener). Remember, ____ (name of listener) has never seen the book before, so tell as much of the story as you can.” The participant was allowed to turn the pages of the book as he/she told the story to the listener. As in the story retell, the principal investigator sat across the room and provided limited prompts when necessary. No more than three prompts were given for each narrative.

Elicitation of Personal Narrative

For personal narratives, each participant was asked, during the session, to tell about something they had done recently or something that happened to them. The principal investigator provided examples, such as birthday parties, vacations, and injuries. After the participant determined an appropriate topic, the principal investigator provided the following instructions: “I want you to tell ____ (name of listener) the story about ____ (chosen topic). I don’t think ____ (name of listener) knows anything about ____ (topic), so be sure to tell as much of your story as you can.” As in the story retell and wordless picture book tasks, the principal investigator sat across the room and provided limited prompts when necessary. No more than three prompts were provided for each narrative.

Transcription

The video-taped narratives were transcribed verbatim into communication units (C-units) using the guidelines set forth by Hughes, McGillivray, and Schmidek (1997). A C-unit is defined as an independent clause with its modifiers. For example, “The frog jumped into the saxophone” was counted as one C-unit while “The frog jumped out of his pocket and then he was jumping all around” was counted as two C-units. A primary transcriber, a trained student studying Communication Sciences, transcribed all the narratives, while the principal investigator proofed 100% of the narratives, with any disagreements in transcription documented and changed by the proofer. The stories were coded for length, setting, internal states, causal statements, reference, irrelevant information, and prompts as follows.

Coding

Length

The length of each narrative was calculated using the *total number of C-units*, *total number of words*, and *mean length of C-unit*. Abandoned utterances (e.g., “*and then he gets...and then something hurt him on the tongue*”), mazes (e.g., “*and then, and then, well, um, then...then he jumps in the water*”), repeated utterances (e.g., “the boy was getting ready/*the boy was getting ready*”), titles and endings that were not clauses (e.g., “*the end*”), and unintelligible words were not included in any measure of length.

Replicating the work of Capps and colleagues (2000), the total number of C-units was used to create proportions for the analysis of measures of reference, internal states, causal statements, irrelevant information, and examiner prompts.

Internal States

References to characters’ internal states were tallied. Identification of internal states was based on the categorization developed by Bretherton and Beeghly (1982). Use of words that met any of the following categories and were used in reference to a story character were tallied: *perception* (e.g., “the frog *saw* a boy playing with a boat”), *physiology* (e.g., “I was so *hungry* I ate two slices of pizza”), *positive and negative affect* (e.g., “the parents were *angry* at the boy for bringing his frog”), *volition and ability* (e.g., “the frog was *able* to get away from the lobster”), *cognition* (e.g., “I didn’t *know* where my brother was”), and *moral judgment and obligation* (e.g., “the mom *had* to climb into the pond to get the toy boat”). Frequency counts of the individual categories were not analyzed; instead, all of the above categories were collapsed into a total internal state

count. It should be noted that other researchers have analyzed mental and emotional state terms separately and have not included all of the above categories (i.e., moral judgment) (Capps et al., 2000; Norbury & Bishop, 2003; Tager-Flusberg, 1995).

Causal Statements

Statements that provided information about the relationship between events, behaviors, and/or internal states using a causal connector were tallied. Causal connectors included: *so, because, if, since, in order to, for, therefore, as a result, the reason why* (e.g., “they leave *because* it is disgusting to have a frog in your salad” or “the boy wasn’t looking, *so* he didn’t notice the frog jumping out of the bucket”) (Capps et al., 2000; Losh & Capps, 2003; Tager-Flusberg, 1995).

Reference

Narratives were examined for the individual’s ability to *introduce* new characters with an unambiguous noun phrase (e.g., “*the boy* went for a walk” or “*a mother* was feeding *a baby*”), *reintroduce* previously mentioned characters with a noun phrase following the introduction/reintroduction of a different character (e.g., “*The chef* angrily looked at the mess that had been made. Then *the frog* hopped by and *the chef* dove to get him.”), and *maintain* character identity with a gender and number specific pronoun (e.g., “*The frog* jumped out of the pocket. Then *he* jumped into the lobster tank.”) (Norbury & Bishop, 2003; Tager-Flusberg, 1995). Narratives were tallied for correct and incorrect use of character *introduction, reintroduction, and maintenance*. In addition to these reference categories, total correct and incorrect reference scores were calculated.

Irrelevant Information and Prompts

The total number of irrelevant C-units that did not contribute to the story was tallied (Norbury & Bishop, 2003; Loveland et al., 1990). This included unnecessary descriptions (e.g., “the cake was of an orangeish color and had confectioner’s sugar on it”), tangential information (e.g., “When somebody orders a lobster they take the lobsters out of the tank, put them in a tray and go to the cook. The cook gives the lobster a sedative and kills it while it’s sleeping.”), comments on how the film was made (e.g., “it zooms in on her face”), personal opinions (e.g., “they have a bad actor playing the dog”), and comments regarding one’s own narration (e.g., “oops, I forgot a part”).

The total number of prompts given by the clinician (e.g., “Is there anything else?” or “Then what happened?”) was also tallied, with a total of no more than three prompts per narrative (Losh & Capps, 2003; Miranda et al., 1998; Tager-Flusberg, 1995; Tager-Flusberg & Sullivan, 1995).

Inter-rater Reliability

The principal investigator coded all transcriptions for length, internal states, causality, reference, irrelevant information, and prompts. A second judge, trained in narrative coding, coded 25% of the narratives, randomly chosen, to establish inter-rater reliability. Agreement for coding was determined using point-by-point analysis on all mutually exclusive categories and disagreements were discussed by the two coders. Reliability on individual categories is as follows: number of C-units, 99.8%; number of words, 99.6%; internal states, 91%; causal statements, 78%; irrelevant information, 87%; reference, 87%.

Results

Statistical analysis was performed using SPSS software. Results are reported for each of the research questions.

Differences between Narratives Told Across Listeners and Contexts

- How do the narratives of children with ASD differ when the listener is an adult or child?
- How do the narratives of children with ASD differ when retelling a story of a previously viewed film, telling the story of a wordless picture book, and telling a story of personal experience?

Number of C-units, number of words, mean length of C-unit, and proportions of causal statements, internal states, correct reference, incorrect reference, and irrelevant information were compared using repeated measures analyses of variance with a prespecified significance of $\alpha = .05$. There were no significant differences for measures of length, internal states, causal statements, or use of irrelevant information. Results yielded, however, one within-subjects effect for character reference. There was a significant difference within the ASD group for character reference [$F(1, 3) = 32.126$, $p = .011$]. Children with ASD used proportionally more correct references in narratives told to adults compared to narratives told to children.

Differences between Narratives Told by Participants with ASD and Those Told by Typically Developing Peers for Each Listener and Context

- How do the narratives of children with ASD, when examined across contexts and types of listener, differ from those of typically developing, language-age matched peers?

The narratives of children with ASD were compared to those of typically developing children using two-tailed independent t-tests, with a prespecified significance of $\alpha = .05$. T-tests were run on raw frequency counts of the following variables: number of C-units, number of words, mean length of C-unit, correct character introduction, incorrect character introduction, correct character reintroduction, incorrect character reintroduction, correct character maintenance, incorrect character maintenance, internal states, causal statements, prompts, and irrelevant information. The reference variables of character introduction, reintroduction and maintenance were collapsed into two categories: total correct reference and total incorrect reference. To control for amount of talk, proportions using number of C-units were computed for total correct reference, total incorrect reference, internal states, causal statements and irrelevant information. Proportions have been used in similar studies examining the narratives of children with ASD compared to other groups (Capps et al., 2000). T-tests were performed to compare narrative differences using proportions. A total of 120 t-tests were performed, of these, 90 tests were completed with raw data and 30 were completed with proportional data. No alpha adjustments were made because this study was exploratory in nature. See Tables 2, 3, 4, and 5 for the descriptive statistics of all narratives. Tables 2 and 3 contain descriptive statistics for narratives told to adult listeners, while Tables 4 and 5 contain descriptive statistics for narratives told to child listeners. The values in Tables 2 and 4 were derived from raw data and the values in Table 3 and 5 were derived from proportions using number of C-units.

Results of t-tests using proportions indicate participants with ASD, compared to typically developing participants, were less likely to include causal statements when relaying their story retell of the video to adult listeners [$t(6) = -3.00, p = .024$]. Children with ASD were also less likely to include causal statements in their wordless picture book stories told to adult listeners [$t(6) = -3.01, p = .024$] (see Figure 1). Results of t-tests using raw frequency counts also indicated that participants with ASD used fewer causal statements in their wordless picture book stories told to adult listeners [$t(6) = -3.28, p = .017$]. However, results using frequency counts did not indicate the use of fewer causal statements in story retell and instead revealed that children with ASD, when compared to typically developing children, used fewer causal statements in their personal narratives told to peer listeners [$t(6) = -5.89, p = .001$].

Participants with ASD did not differ significantly from typically developing participants in the frequency of accurately used references in any narrative type. T-tests using both raw frequency counts [$t(6) = 2.83, p = .030$] and proportions [$t(6) = 3.78, p = .009$], however, indicated children with ASD were more likely than typically developing participants to incorrectly refer to characters in personal narratives told to an adult listener (see Figure 2).

Groups did not differ significantly on measures of length including total number of C-units, total number of words, or mean length of C-unit in any type of narrative. In addition, groups did not differ significantly on measures of internal states, irrelevant information, or prompts.

Discussion

The purpose of this study was to contribute to the growing base of knowledge regarding the narrative language skills of children with ASD. Impairments in producing complex syntax, unambiguously introducing characters, placing character's behaviors, thoughts and feelings within a causal explanatory framework, and providing only information that is appropriate and relevant to the story are evident in the research on narrative ability of children with ASD (Capps et al., 2000; Diehl et al., 2006; Losh & Capps, 2003; Loveland et al., 1990; Norbury & Bishop, 2003; Tager-Flusberg, 1995). Limited research on how the narratives of children with ASD differ across contexts with varying linguistic and cognitive demands and degrees of support has been conducted. Nonetheless, the existing literature has established that children diagnosed with ASD with relatively high cognitive and language scores (e.g., within the normal range) may demonstrate greater difficulty communicating narratives within a less structured context, namely spontaneous narratives of personal experience (Losh & Capps, 2003).

This study sought to address the following three questions: How do the narratives of children with ASD differ when the listener is an adult or child? How do the narratives of children with ASD differ when retelling a story of a previously viewed film, telling the story of a wordless picture book, and telling a story of personal experience? How do the narratives of children with ASD, when examined across contexts and types of listener, differ from those of typically developing, language-age matched peers?

Analyses revealed a surprising amount of similarities between the narratives of children with ASD and their typically developing peers, as well as within the ASD group

across the various narrative contexts and listeners. The ASD and typically developing groups did not differ significantly on measures of story length, internal states, irrelevant information, or examiner prompts across any of the narrative contexts. However, significant differences were revealed in measures of causal statements and character references. Participants in the ASD group were less likely to use causal statements in the wordless picture book and video retell narratives told to adult listeners (proportional data) and personal narratives told to child listeners (raw data). A difference between groups in the use of causal statements is in agreement with previous studies of wordless picture book (Losh & Capps, 2003; Tager-Flusberg, 1995), video retell (Diehl et al., 2006) and personal narratives (Losh & Capps, 2003). It should be noted that in this study, causal statements explaining thoughts, feelings, behaviors, actions, and events were all coded together in one category. Therefore, causal statements explaining characters' internal states were not analyzed independently as they were in the work of Capps and colleagues (2000). Because there were no significant differences between or within groups on the mention of internal states, specific information regarding the use of causal statements to explain characters' thoughts and feelings may provide greater insight to the cognitive and emotional understanding of children with ASD compared to their peers and their ability to apply such understanding to a causal explanatory framework to address the needs of the listener across different narrative contexts.

Compared to their typically developing peers, participants with ASD were more likely to use incorrect character references when telling personal narratives to adult listeners. In numerous instances, these children introduced and reintroduced characters

using a pronoun (e.g., “we”) instead of a noun phrase (e.g., “My brother and I”), thus leaving out information critical to understanding the story. This finding is in agreement with previous narrative studies that found children with ASD to use ambiguous character references (Loveland et al., 1990; Tager-Flusberg, 1995) and ambiguous nouns (Norbury & Bishop, 2003).

Overall, the narratives told by children with ASD were more similar than different across the various communicative contexts and listeners. There were no significant differences across contexts or listeners on measures of length, causal statements, internal states, or irrelevant information. The only difference found was in the use of character references. Children in the ASD group used proportionally more correct character references in their narratives told to adult listeners compared to those told to child listeners. Comparing the proportions of references in the discrete categories (introduction, reintroduction, and maintenance) coded, which were summed to obtain a total correct reference measure, may provide further information regarding how the references differed across listeners.

It was not necessarily surprising that narratives of children with ASD did not differ significantly across contexts or listeners, or compared to typically developing children on measures of story length because previous studies have found variable results on this measure, which may be due to differences in methodology (Capps et al., 2000; Tager-Flusberg, 1995; Tager-Sullivan & Sullivan, 1995). It was, on the other hand, notable that there were no significant differences found in the use of irrelevant information. Several previous studies have found children with ASD to use more

irrelevant information or instances of inappropriate storytelling in their story retell and personal narratives (Diehl et al., 2006; Losh & Capps, 2003; Loveland et al., 1990). Upon reflection, the lack of differences in use of irrelevant information may be due to the coding rules that were developed and followed. Irrelevant C-units were tallied only if they were purely irrelevant or tangential and did not contain any information necessary to understanding the story (e.g., character reference necessary for understanding the following C-unit). Thus, this coding scheme may have been more generous in accepting C-units that might otherwise be excluded from previous studies. Although quantitative analysis did not reveal significant group differences in the amount of irrelevant information within narratives, it should be noted that the narratives of participants with ASD were qualitatively unique, demonstrating a range of inappropriate or bizarre story telling, from very short narratives with limited information, to excessively long, tangential narratives. One individual with ASD told his video retell in the following five C-units:

“This is called Frog Goes to Dinner/ this is a story of a little kid who has a frog/ and when he made a mistake was bringing him to dinner/ when the baker’s boss was about to cut the frog, the little kid said, ‘stop’/ that’s all”

On the other hand, another individual with ASD told his video retell in 266 C-units, frequently diverging into drawn out descriptions, such as:

“These two guys look like all the generic aunts and uncles that you see in cartoons/ the aunt kisses you in front of your friends and embarrasses you and pinches your cheeks like this so you have a bruise/ and the uncle comes in,

speaking much too loudly with his toupee that looks like spinach and squeezes your hand like a vice”

While distinctly different, both of these narratives demonstrate departures from typical narrative language and reinforce a theory of impairments in pragmatic language use and social understanding in the narratives of individuals with ASD.

Limitations of this study

Several limitations potentially impacted the results of this study. First, it is likely that the effect of a small sample size was compounded by the wide range of individual differences across narratives in the ASD group. For instance, whereas one participant in this group produced a video retell narrative that was 266 C-units in length, another participant relayed his video retell narrative in only five C-units. In addition, a considerable amount of variation in narrative measures was created by the responses from one participant with a diagnosis of Asperger’s syndrome who told noticeably longer and more complex narratives across all contexts and listeners compared to participants in both the ASD and typically developing groups. This individual’s unique narrative productions likely influenced the results of this study. With this in mind, a follow-up analysis of the data with this particular participant’s narratives removed should be a consideration as it may reveal differences in the results.

Another limitation related to small sample size which may have contributed to the variability among narratives was the fact that of the four participants with ASD, two distinct diagnoses were represented, pervasive developmental disorder-not otherwise specified (PDD-NOS) and Asperger’s syndrome (AS). The narrative performances

among different groups of children with ASD was investigated by Losh and Capps (2003) who included participants with High Functioning Autism (HFA) and AS in their study. Although these researchers did not find significant differences in narrative performance for these two subgroups, there is still reason to suspect that these groups, as well as individuals diagnosed with PDD-NOS, may each exhibit unique profiles of narrative language strengths and challenges based on their distinct diagnostic criteria. The potential for differential performance based on subthreshold diagnoses requires further investigation.

To attempt to account for the variability in story lengths, or amount of talk, across participants, the total number of C-units in each narrative was used to create proportions for measures of reference, internal states, causal statements, and irrelevant information, as was done in a previous study of narrative ability (Capps et al., 2000). Some researchers have demonstrated that dividing the frequency of a variable of interest by the total number of the linguistic unit of measurement (e.g., C-units, propositions, words) does not control for the amount of talk and may lead to more seriously flawed conclusions than would no adjustment (Hutchins, Brannick, Bryant, & Silliman, 2005). Instead, they recommend standardizing the size of the language sample with a predetermined length (e.g., number of words, number of minutes talking) to “minimize the effects of amount of talk” (Hutchins et al., 2005, p. 359). Future studies of narrative ability may consider standardizing the length of narratives elicited in order to isolate variables such as internal states or irrelevant information; however, this methodology of sample standardization

may prove to be troublesome in examining variables that require a complete narrative, such as episodic structure and causal connectedness.

Due to the design of this study and the high number of independent variables examined, a total of 120 t-tests were performed to compare differences in narratives between the ASD and typically developing groups. Because this study was primarily exploratory, alpha level adjustments were not made, which is an identified limitation.

An additional limitation relates to the role of the principal investigator (PI), who initiated the elicitation of narratives, was present throughout the production of narratives, and provided prompts for continuation when necessary. First, the mere presence of the PI during narratives, even though distanced, may have contributed to the lack of significant differences between narratives told to child and adult listeners. Her presence across all narratives as an adult audience may have influenced the communicative environment, affecting possible differences in narratives relayed to child listeners. To avoid this potentially confounding factor in future studies, the PI may choose to train the adult and child listeners to provide prompts, thus eliminating the need for PI's presence and increasing the naturalness of the interaction. Additional attempts to make the communicative environment as natural as possible (e.g., using a familiar listener, allowing the listener to ask questions for clarification) would be beneficial in capturing narratives closest to those of everyday social situations.

Conclusions and Implications for Future Research

This study provides further evidence of the differences in the narrative language of children with ASD and their typically developing peers, particularly in the domains of

causality and character referencing. In addition, it has served as an initial attempt to compare participants' narratives across different listeners and contexts with varying demands and supports, and provides preliminary evidence of a difference in the use of character references by children with ASD when telling stories to adults and peers. This study did not, however, examine certain measures central to the quality of narratives, including episodic structure and syntactic complexity. Continued research of the narrative abilities of individuals with ASD across various communicative contexts should include these measures as they may provide valuable information regarding how these children use what they know about a specific story to relate to the listener's needs.

Another area worth examining is related to the listener's understanding of narratives told by children with ASD. Future research in this area may provide greater insight to the abilities or challenges of children with ASD to meet the listener's needs through story-telling.

Table 1 Descriptive characteristics of participants.

Participant	Dx	Gender	Age (years:months)	CELF (CLS SS)	PPVT (SS)	TONI (SS)
1	Asperger's	M	8:11	85	103	98
2	PDD-NOS	M	9:0	85	84	91
3	PDD-NOS	M	9:8	91	97	123
4	Asperger's	M	11:3	124	145	98
5	-	F	10:5	114	-	-
6	-	F	8:0	111	-	-
7	-	M	10:8	115	-	-
8	-	M	9:2	115	-	-

Table 2 Descriptive statistics, derived from raw data, of narratives told to an adult listener

Variable	Narrative Context											
	Video				Book				Personal			
	TD		ASD		TD		ASD		TD		ASD	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Correct reference	42.50	11.48	35.00	33.89	49.77	26.81	58.00	25.63	14.75	4.27	12.75	7.50
Incorrect reference	12.50	11.59	10.25	11.53	5.75	3.59	4.75	3.78	1.00*	.82	3.00*	1.16
Internal states	11.00	4.69	13.00	17.66	10.75	5.68	10.00	7.48	6.25	2.22	4.50	4.44
Causal statements	4.50	1.92	2.75	5.50	3.75*	1.71	.50*	1.00	2.00	1.63	1.75	2.06
Number of words	447.00	110.53	624.75	879.80	392.00	217.47	436.75	301.06	258.25	63.34	211.25	92.05
MLC-unit	8.56	.88	9.73	1.57	9.27	0.97	8.83	2.98	10.24	.98	8.43	2.01
C-units	53.50	18.98	59.00	78.34	41.00	18.07	46.25	19.24	25.00	4.24	22.75	6.85
Prompts	.00	.00	.75	.50	.00	.00	.25	.50	.25	.50	.50	.58
Irrelevant information	.75	1.50	8.50	17.00	.75	1.50	2.50	5.00	1.00	1.16	.75	.50

*Significant differences between the typically developing and ASD groups, $p < .05$.

Table 3 Descriptive statistics, derived from proportions, of narratives told to an adult listener

Variable	Narrative Context											
	Video				Book				Personal			
	TD		ASD		TD		ASD		TD		ASD	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Correct reference	.844	.298	.887	.533	1.186	.244	1.263	.465	.604	.218	.535	.263
Incorrect reference	.214	.151	.226	.161	.160	.128	.143	.153	.041*	.038	.119*	.017
Internal states	.207	.084	.200	.074	.256	.038	.198	.106	.245	.050	.170	.134
Causal statements	.085*	.034	.016*	.031	.100*	.059	.008*	.016	.079	.066	.057	.067
Irrelevant information	.021	.042	.049	.097	.011	.022	.039	.078	.036	.042	.031	.024

*Significant differences between the typically developing and ASD groups, $p < .05$.

Table 4 Descriptive statistics, derived from raw data, of narratives told to a child listener

Variable	Narrative Context											
	Video				Book				Personal			
	TD		ASD		TD		ASD		TD		ASD	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Correct reference	34.75	18.19	47.50	54.98	46.50	11.90	49.25	38.37	18.75	6.40	9.25	6.13
Incorrect reference	11.75	12.12	14.50	13.18	6.50	4.93	7.00	4.32	.75	.96	1.50	1.00
Internal states	9.75	6.95	16.75	18.43	10.00	2.16	11.00	7.39	9.25	5.74	6.50	4.93
Causal statements	3.75	2.50	2.75	4.86	2.25	2.06	1.75	3.50	5.00*	1.41	.50*	.58
Number of words	418.00	273.16	1029.00	1525.79	346.23	75.48	561.25	585.68	289.25	104.59	241.00	227.50
MLC-unit	8.46	1.21	9.24	2.48	8.33	.90	9.28	4.26	8.99	.98	9.60	1.38
C-units	53.75	40.27	91.00	120.89	42.00	10.00	50.75	30.60	34.25	15.90	23.50	19.98
Prompts	.25	.50	.25	.50	.00	.00	.75	.96	.00	.00	.75	.96
Irrelevant information	2.25	2.22	24.50	45.05	.75	1.50	4.25	5.32	1.00	1.41	8.75	16.19

*Significant differences between the typically developing and ASD groups, $p < .05$.

Table 5 Descriptive statistics, derived from proportions, of narratives told to a child listener

Variable	Narrative Context											
	Video				Book				Personal			
	TD		ASD		TD		ASD		TD		ASD	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Correct reference	.793	.272	.725	.482	1.147	.350	.893	.187	.616	.281	.485	.274
Incorrect reference	.217	.120	.210	.196	.149	.112	.179	.103	.025	.033	.072	.071
Internal states	.181	.081	.159	.157	.247	.076	.201	.076	.304	.195	.274	.089
Causal statements	.100	.078	.013	.018	.064	.075	.019	.038	.168	.073	.052	.079
Irrelevant information	.099	.157	.118	.155	.014	.028	.060	.054	.026	.030	.203	.306

Figure 1 Differences between children with ASD and typically developing children on the proportion of causal statements in narratives told to adult listeners

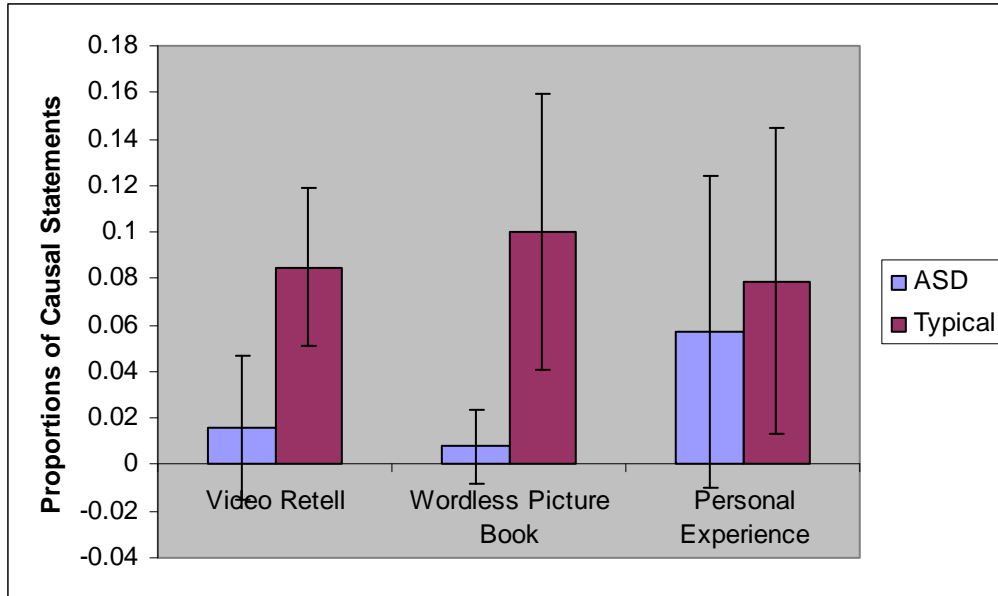
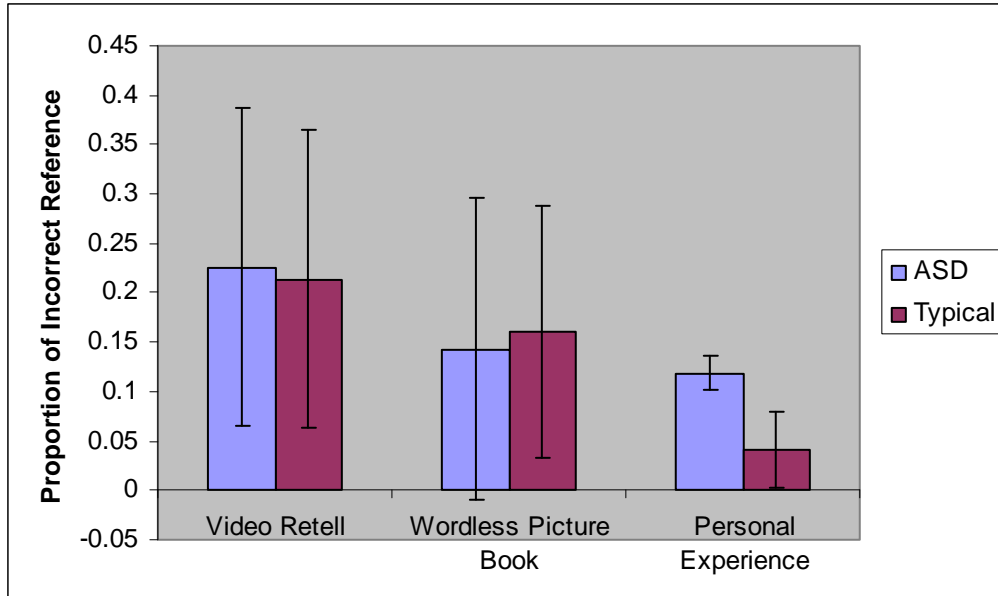


Figure 2 Differences between children with ASD and typically developing children on the proportion of incorrect references in narratives told to adult listeners



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